Space Weather Forecast

Issued on Saturday, 21 January 2023 at 13:14 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: R1/R2 Radio Blackouts considered likely throughout. Chance of G1/Minor Geomagnetic Storms days 3 and 4 (23rd and 24th).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low through the past 24 hours, with common-class flares. A coronal mass ejection from 20th has been analysed as missing ahead of Earths orbit, though a there is a chance of glancing impacts at Earth on day 3 (23 Jan). No other Earth-directed CME have been observed.

Solar Wind / Geomagnetic Activity: Solar wind speeds have been on a slow gradual upward trend, rising from around Slightly elevated to Elevated levels. The Interplanetary Magnetic Field was generally steady at moderate levels initially, before becoming erratic and fluctuating between weak and moderate levels during 21st. The north-south component was weak and mostly positive initially before becoming erratic with a more prolonged spell of negative Bz at mostly moderate levels between 21/0300-0600 UTC. Geomagnetic activity was Quiet to Unsettled (Kp 0-3), with two Active (Kp 4) intervals between 21/0300-0900 UTC.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Low to Moderate, with a slight chance of reaching High levels, with two large and complex sunspot regions on the visible disc, which are capable of producing significant flares.

Solar Wind / Geomagnetic Activity: The high speed stream from coronal hole 68 will likely continue to effect Earth during day 1 (21st) perhaps into day 2 (22nd), though easing over time. 2 coronal mass ejections may effect Earth during day 3 (23rd), though both are low confidence. Coronal hole 69 is likely to connect with Earth during day 4 (24th), with speeds of around 550 km/s expected.

Generally Quiet to Active geomagnetic activity is expected through the period, with a slight chance of G1/Minor storms day 1 (21st) due to then fast wind of coronal hole 68, then a chance of G1/Minor storms on days 3 and 4 (23rd and 24th) due to potential coronal mass ejection arrivals and then the fast wind of coronal hole 69 respectively.

Energetic Particles / Solar Radiation: Solar radiation will most likely remain at background levels, but with a slight chance of enhancements to S1 or greater through the period, in association with any larger flares.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	5	30	30
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	70	70	70	70
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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